

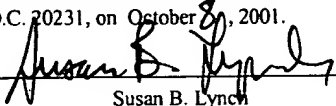


0870 #6  
0107

PATENT  
Docket No.278012001420

**CERTIFICATE OF MAILING BY "FIRST CLASS MAIL"**

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:  
Assistant Commissioner for Patents, Washington, D.C. 20231, on October 8, 2001.

  
Susan B. Lynch

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In the application of:

Carlos F. BARBAS, III, et al.

Serial No.: 09/765,555

Filing Date: January 19, 2001

For: METHODS AND COMPOSITIONS TO  
MODULATE EXPRESSION IN  
PLANTS

Examiner: Not yet assigned

Group Art Unit: 1638

**REQUEST FOR CORRECTION OF DRAWINGS**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Enclosed are substitute sheets of drawings for Figure 24 in connection with the above-identified application. In addition, please find enclosed a set of drawings showing the proposed changes in red.

The Figures were amended to include sequence identification numbers which were omitted at the time of filing.

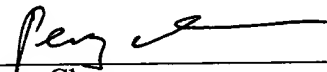
Applicants respectfully request the entry of these amendments.

In the unlikely event that the transmittal letter is separated from this request and the U.S. Patent Office determines that an extension and/or other relief is required, applicants petition for any required relief including extensions of time and authorize the Assistant Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing to our Deposit Account No. 03-1952. However, the Assistant Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: October 8, 2001

By:



Peng Chen  
Registration No. (43,543)

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San Diego, California 92130-2332  
Telephone: (858) 720-5112  
Facsimile: (858) 720-5125

Figure 24

(1) Sequence of promoter CsVMV (Example 1A) (SEQ ID NO:1):

Tctagaaactagctccagaaggaattccaagatgtagcatcaagaatccaatgtttacgggaaaaactatggaa  
gtattatgtgagctcagcaagaagcagatcaatatcggcacatatgcaacatatgttcaaaaatgaagaatgtacagatacaag  
atcctatactgccagaatacgaagaagaatacgtagaaattgaaaaagaagaaccaggcgaagaaaagaatcttgaagacgta  
agcactgacgacaacaatgaaaagaagaagataaggtcggtgattgtgaaagagacatagaggacacatgtaagggtggaaaa  
tgaagggcggaagtaaccttatcacaaggaatcttatccccactacttatccttttatattttccgtgtcattttgcccttgagt  
ttcctataaaggaaccaagttcggcattgtgaaaacaagaaaaatttggtgaagctattttcttgaagtactgaggatacaact  
tcagagaaatttgaagtttga

Total 531 bp

(2) Sequence of zinc finger protein 2C7 binding site (Example 1A) (SEQ ID NO:2):

GCG TGG GCG GCG TGG GCG

Total 18 bp.

(3) Sequence of promoter pc7rbTATA (Example 1A) (SEQ ID NO:3):

Cccgggtatataataagcttggcattccggtactgttgtaaagccacat

Total 51 bp.

(4) Sequence of pND3008 coding region (Example 1B) (SEQ ID NO:4):

agcgtgacccggctgtgccctctctagagataatgagcattgcatgtctaagtataaaaaattaccacatattttttg  
tcacactgtttgaagtgcagtttatctatctttatacatatatttaactttactctacgaataatataatctatagtactacaataatca  
gtgttttagagaatcatataaatgaacagtttagacatggtctaaaggacaattgagtatttgacaacaggactctacagtttatcttt  
ttagtgtgcatgtgttctcctttttttgcaaagcttcacctatataaacttcacattttattagtagacatccatttagggttagggtt  
aatgggttttatagactaatttttttagtacatctattttattctatttttagcctctaaattaagaaaactaaaactctatttttagtttttattta  
ataatttagatataaaatagaataaaataaagtgactaaaaaataaacaataaccctttaagaaataaaaaaactaaggaaacatttt  
tcttgtttcgagtagataatgccagcctgttaaaccgctgcgacgagctaacggacaccaaccagcgaaccagcagcgtcgcg  
tcgggccaagcgaagcagacggcacggcatctctgtcgtgcctctggacccctctcgagagttccgctccaccgttggaacttg  
ctccgctgtcggcatccagaaattgcgtggcggagcggcagacgtgagccggcacggcagggcgccctcctcctctcacg  
gcacggcagctacggggattctttccaccgctccttgcgtttccttctcgcggcgtaataaataagacacccctccaca

ccctctttccccaacctcgtgttgctggagcgacacacacacaaccagatctccccc aaatccaccgctcgacacctccgctt  
 caagggtacgccgctcgtcctccccccccccccctctctaccttctctagatcggcgttccgggtccatggttagggcccggttagtgc  
 tacttctgttcatgtttgtgttagatccgtgtttgtgttagatccgtgctgctagcgttctgtacacggatgcgacctgtacgtcagacac  
 gttctgattgctaacttgccagtgtttctcttggggaatcctgggatggctctagccgttccgcagacgggatcgatttcatgattttt  
 tttgtttcgttgcatagggttgggttgccttttcttatttcaatatatgccgtgcacttgttgcgggtcalcttttcatgcttttttgt  
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 atggatggaaatcgcgtcagtaggtaggtatacatgttgatgtgggttttactgatgcatacatgatggcatatgcagcatctattc  
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 gcagctatatgtggatttttagccctgccttcatacgtctatttatttgccttggtactgtttcttttgcgatgctcaccctgttgttgggt  
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 cttcagtcgtagtaccaccttaccacccacatccgcacccacacaggcgagaagcctttgcctgtgacatttggggaggaag  
 tttgccaggagtgatgaacgcaagaggcatacaaaatccataccgggtgagaagccctatgcttgcctgtcagtcctgcgatc  
 gccgcttttctaagtcggctgatctgaagcgccataccgcgtccacacaggccagaagcccttccagtgtcgaatatgcagcgt  
 aacttcagtcgtagtaccaccttaccacccacatccgcacccacacaggcgagaagcctttgcctgtgacatttggggagga  
 agtttgccaggagtgatgaacgcaagaggcatacaaaatccatttaagacagaaggactctagaactagtggccaggccggc  
 caggctagcccga aaaagaaacgcaaagtggcgcgccgacgcgtggacgatttcgatctcgacatgctgggttctgatgc  
 cctcgtatgactttgacctggatgttgggaagcgacgcattggatgactttgatctggacatgctcgggtccgatgctctggacg  
 atttcgatctcgatatgttaattaactacccgtacgacgttccggactacgcttcttgagaattcgcggccgccccgagccctag  
 ggaggagctcaagatccccgaatttccccgatcgttcaaactttggcaataaagtttcttaagattgaatcctgttgcgggtcttg  
 cgatgattatcatctaatttctgttgattacgttaagcatgtaataaataacatgtaatgcaggttattatgagatgggttttatga  
 ttagagtcgccgaattatacatttaacgcgatagaaaacaaaatatagcgcgcaaactaggataaattatcgcgcgcggtgtca  
 tctatgttactagatccgggaattgggtac

Total:	3120 bp
ZmUbi promoter:	44 bp to 2026 bp
Six finger ZFP2C7:	2060 bp to 2588 bp
Nuclear localization signal:	2620 bp to 2641 bp
VP64 activation domain:	2641 bp to 2805 bp

HA epitope tag: 2805 bp to 2836 bp  
Nos terminator: 2884 bp to 3164 bp

(5) Sequence of pND3018 coding region (Example 1B) (SEQ ID NO:5):

agcgtgacccggtcgtgcccctctctagagataatgagcattgcatgtctaagttataaaaaattaccacatattttttg  
tcacacttgtttgaagtgcagttatctatctttatacatatatttaaactttactctacgaataatataatctatagtactacaataatca  
gtgttttagagaatcatataaatgaacagttagacatggtctaaaggacaattgagtatttgacaacaggactctacagtttatcttt  
ttagtgtcatgtgttctcctttttttgcaaatagcttcacctatataatacttcatccattttattagtagatccatttaggggttaggggtt  
aatggttttatagactaatttttttagtacatctattttattctattttagcctctaaattaagaaaactaaaactctatttttagtttttatta  
ataatttagatataaaatagaataaaaataaagtactaaaaataaacaataacccttaagaaattaaaaaactaaggaaacatttt  
tcttgtttcagtagataatgccagcctgttaaaccgctgcgacgagtctaacggacaccaaccagcgaaccagcagcgtcgcg  
tcgggccaagcgaagcagacggcagggcatctctgtcgtcgtccttgacccctctcgagagttccgctccaccgttgacttg  
ctccgctgtcggcatccagaaattgcgtggcggagcggcagacgtgagccggcagggcggcctcctcctctcctcag  
gcacggcagctacgggggattcctttccaccgctccttcgctttccctcctcgcccgccgtaataaatagacacccctccaca  
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caaggtacgccgctcgtcctccccccccccccctctctaccttctctagatcggcgttccgggtccatggttagggcccggtagttc  
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gttctgattgctaacttgccagtggttctctttggggaatcctgggagggctctagccgttcgcgacgggatcgtttcatgattttt  
tttgttgcgtgcataggggtttggttgccttttcttttattcaatatgccgtgcactgtttgtcgggtcatctttcatgctttttgt  
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cgggttttactgatgcatatacagagatgctttttgttcgcttgggtgtgatgtgtgtgtggttggcggtcgttcattcgttctagat  
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gcagctatatgtggatttttttagccctgccttcatacgtatttttgcgttggtactgttcttttgcgatgctaccctgttgttgggt  
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acgttattatgagatgggtttttatgattagagtgccgcaattatacatttaatacgcgatagaaaacaaaatatagcgcgcaaacta  
ggataaattatcgcgcggtgtcatctatgttactagatccgggaattccggaccggtaccagcgcc

Total:	3068 bp
ZmUbi promoter:	44 bp to 2026 bp
SID repression domain:	2066 bp to 2173 bp
Nuclear localization signal:	2174 bp to 2194 bp
Six finger ZFP2C7:	2207 bp to 2735 bp
HA epitope tag:	2762 bp to 2791 bp
Nos terminator:	2820 bp to 3112 bp

(6) Sequence of 6X2C7 binding site (SEQ ID NO:6):

Cgtgctagcgcgtggcgccgctgggcgaacaagcgtggcgccgctgggcgaacaagcgtggcgccgctgggc  
gactagtctagcgcgtggcgccgctgggcgaacaagcgtggcgccgctgggcgaacaagcgtggcgccgctgggcgac  
tagtg

Total: 155 bp

(7) Sequence of 3 finger protein C7: (SEQ ID NO:73)

Atggcccaggcgccctcgagccctatgcttgcctgtcgagtcctgcgatcgccgcttttctaagtcggctgatctg  
aagcgccatattccgatccacacaggccagaagcccttccagtgtcgaatatgcatgcgtaacttcagtcgtagtaccacctta  
ccaccacatccgcacccacacaggcgagaagccttttgcctgtgacatttggggagggaagttgccaggagtgatgaacgca  
agaggcatacaaaatccatttaagacagaaggactctagaacttagtgccaggccggccaggctagc

Total: 314 bp

(8) Amino acid sequence of 3 finger protein C7: (SEQ ID NO:74)

Maqaalepyacpvescdrrfsksadlkrhrihtgqkpfqcricmmfsrcdhlththrtgkpfacdicgrkfar  
sderkrhtkihlrqkdsrtsgagqas

Total: 105 aa

(9) Sequence of zinc finger protein ZFPap3 binding site:

GAT GGA GTT GAA GAA GTA (SEQ ID NO:7)

Total: 18 bp

(10) Sequence of zinc finger protein ZFPm1 and ZFPm2 binding site m12:

GCC TCC TTC CTC CTC TCA CTC (SEQ ID NO:8)

Total: 21 bp

ZFPm1 binding site: compliment strand of 1 to 18

ZFPm2 binding site: compliment strand of 4 to 21

(11) Sequence of zinc finger protein ZFPm3 and ZFPm4 binding site m34:

GCC AAC TAC TAC GGC TCC CTC ACC (SEQ ID NO:11)

Total: 21 bp

ZFPm3 binding site: compliment strand of 1 to 18

ZFPm4 binding site: compliment strand of 7 to 24

(12) Partial sequence of pMal-m1 (1-3300 bp) and zinc finger protein ZFPm1

(2719-3270 bp) (SEQ ID NO:14):

ccgacaccatcgaatggtgcaaaaccttcgcggtatggcatgatagcgcccggaagagagtcattcagggtggt  
gaatgtgaaaccagtaacgttatacatgatgtcgagagtatgccggtgtctcttatcagaccgttcccgcgtggtgaaccaggcca  
gccacgtttctgcgaaaacgcgggaaaaagtgaagcggcgatggcggagctgaattacattccaaccgcgtggcacaaca  
actggcggggcaaacatcgttgcgtgattggcgttgcacacctcagctggccctgcacgcgccgtcgcaattgtcgcggcgat  
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gtgcacaatcttctcgcgaacgcgtcagtggtggtgatcattaactatccgctggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgttcggcggtatttcttgatgtctctgaccagacacccatcaacagtatttttcccatgaagacgggtacgcga  
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gttttcaaaaaccatgcaaatgctgaatgagggcatcgttccactgcgatgctggtgccaacgatcagatggcgctgggcgc  
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cctctccccgcgcgttggccgattcattaatgcagctggcacgacaggttccccgactggaaagcgggcagtgagcgcaacgc  
aattaatgtgagttagctcactcattaggcacaattctcatgtttgacagcttatcatgactgcacgggtgcaccaatgcttctggcg  
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ggataatgtttttgcgcggacatcataacggttctggcaaatattctgaaatgagctgttgacaattaatcgcgctcgtataatgt  
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atagattatgaaaactgaagaaggtaaaactggtaatctggattaacggcgataaaggctataacggctctcgtgaagtcggtaag  
aaattcgagaaagataccggaattaaagtcaccgttgagcatccggataaactggaagagaaattcccacaggttgcggcaact  
ggcgatggccctgacattatcttctgggcacacgaccgcttgggtggctacgctcaatctggcctgttggctgaaatcaccccg  
acaaagcgttccaggacaagctgtatccgtttacctgggatgccgtacgttacaacggcaagctgattgcttaccgatcgtgtt  
gaagcgttatcgtgattataacaaagatctgctgccgaacccgccaaaacctgggaagagatccggcgctggataaagaa  
ctgaaagcgaaaggtaagagcgcgctgatgtcaacctgcaagaaccgtacttcacctggccgctgattgctgctgacgggggt  
tatcggttcaagatgaaaacggcaagtacgacattaaagacgtgggcgtggataacgctggcgcgaaagcgggtctgaccttc  
ctggttgacctgattaaaaacacacatgaatgcagacaccgattactccatcgcagaagctgcctttaataaaggcgaaacag  
cgatgaccatcaacggcccgtgggcatgtccaacatcgacaccagcaaagtgaattatggtgtaacgggtactgccgacctca  
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aagacgcgcagactaatcagctcgaacaacaacaataacaataacaacacctgggatcgagggaaggatttcagaa  
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tcagagctctcacctggtgcgccaccagctacccacacgggtgaaaaaccgtataaatgccagagtgccgcaaatcttttag  
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cggctgacaatctcgtccggcaccaacgtactcacaccggggagaagccctatgcttgcggaatgtggtgaagtcttcagcc  
gcagcgataacctggtgcgccaccagcgtacccacacgggtgaaaaaccgtataaatgccagagtgccgcaaatcttttagc  
caggccggccacctggccagccatcaacgcactcactactggcgagaagccatacaaatgtccagaatgtggcaagctttctct  
cggctgacaatctcgtccggcaccaacgtactcacaccggtaaaaaactagtggccaggccggccagtagccgtacgacgt  
tccggactacgt



Total: 514 bp

Primer F1-f1 of ZFPm1: 2770 bp to 2850 bp

Primer F1-f2 of ZFPm1: 2740 bp to 2790 bp

Primer F2-f of ZFPm1: 2867 bp to 2940 bp

Primer F2-b of ZFPm1: 2824 bp to 2889 bp

Primer F3-b1 ZFPm1: 2916 bp to 2973 bp

Primer F3-b2 ZFPm1: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm1: 3022 bp to 3102 bp

Primer F4-f2 of ZFPm1: 2992 bp to 3042 bp

Primer F5-f of ZFPm1: 3119 bp to 3192 bp

Primer F5-b of ZFPm1: 3076 bp to 3141 bp

Primer F6-b1 of ZFPm1: 3168 bp to 3225 bp

Primer F6-b2 of ZFPm1: 3205 bp to 3273 bp

(13) Sequence of zinc finger protein ZFPm1

(Translated from pMal-m1: 2719-3270 bp): (SEQ ID NO:75)

Aqaalepgekpyacpecgksfsdpghlvhrhqrhtgekpykpecgksfsqrahlerhqrhtgekpykpec  
gksfsqssnlvrhqrhtgekpyacpecgksfsrsdnlvrhqrhtgekpykpecgksfsrsdnlvrhqrhtgekpykpe  
cgksfsqaghlashqrhtgkktsgqag

(14) Partial sequence of pMal-m2 (1-3300 bp) and zinc finger protein ZFPm2

(2719-3270 bp) (SEQ ID NO:15):

ccgacaccatcgaatggtgcaaaaccttcgcggtatggcatgatagcgcccggaagagagtcaattcagggtgt  
gaatgtgaaaccagtaacgttatagatgtcgcagagtatgccggtgtctcttatcagaccgttcccgcgtggtgaaccaggcca  
gccacgtttctcgaaaacgcgggaaaaagtgaagcggcgatggcggagctgaattacattcccaaccgcgtggcacaaca  
actggcgggcaaacagtcgttgatggcgttgccacctcagctggccctgcacgcgccgtcgcaaattgtcgcggcgat  
taaattctcgccgatcaactgggtgccagcgtggtgtcgtatgtagaacgaagcggcgtcgaagcctgtaaagcggcg  
gtgcacaattctctcgcaacgcgtcagtggtgatcattaactatccgctggatgaccaggatgccattgctgtggaagctg  
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gtttcaacaacatgcaaatgctgaatgagggcatcgttccactgcgatgctggttccaacgatcagatggcgtgggcgc  
aatgcgcgccattaccgagtcgggctgcgcgttggtgcggatctcggtagtgggatacgacgataccgaagacagctcat  
gttatatcccgccgtaaccacatcaaacaggattttgcctgctggggcaaaccagcgtggaccgcttctgcaactctctcag  
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aattaatgtgagttagctcactcattaggcacaattctcatgtttgacagcttatcatcgactgcacgggtgcaccaatgcttctggcgt  
caggcagccatcggaagctgtggtatggctgtgcaggtcgtaaatcactgcataattcgtgtcgtcaaggcgcactcccgttct  
ggataatgtttttgcgccgacatcataacggttctggcaaatattctgaaatgagctgttgacaattaatcatcggtcgtataatgt  
gtggaattgtgagcggataacaatttcacacaggaaacagccagtcggttaggtgttttcacgagcacttcaccaacaaggacc  
atagattatgaaaactgaagaaggtaaaactggtaatctggattaacggcgataaaggctataacgggtctcgtgaagtcggtaag  
aaattcgagaaagataccggaattaaagtcaccggtgagcatccggataaactggaagagaaattcccacaggttgcggcaact  
ggcgatggccctgacattatcttctgggcacacgaccgcttgggtggtacgctcaatctggcctgttggctgaaatccccgg  
acaaagcgttccaggacaagctgtatccgtttacctgggatgccgtacgttacaacggcaagctgattgcttaccgatcgtgtt  
gaagcgttatcgctgatttatacaaaagatctgctgccgaaccgccaaaaacctgggaagagatcccggcgctggataaagaa  
ctgaaagcgaaaggtaagagcgcgctgatgttcaacctgcaagaaccgtacttcacctggccgctgattgctgctgacgggggt  
tatgcgttcaagtatgaaaacggcaagtagacattaaagacgtggcggtggataacgctggcgcgaaagcgggtctgacctt  
ctggttgacctgattaaaaaacaacacatgaatgcagacaccgattactccatcgagaagctgcctttaataaaggcgaaacg  
cgatgaccatcaacggcccgtggcatggtccaacatcgacaccagcaaagtgaattatggtgtaacgggtactgccgaccttca  
agggtcaaccatccaaaccgttctgtggcggtgctgagcgcaggtattaacgccgccagtcggaacaaagagctggcaaaaga  
gttctctgaaaactatctgctgactgatgaaggcttggaaagcggtaataaagacaaaccgctgggtgccgtagcgtgaagtct  
tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaaaacgccagaaaggtgaaatcatgccgaacatcc  
cgcagatgtccgctttctggtatgccgtgactgcggtgatcaacgccgccagcggctcgtcagactgtcgtatgaagccctga  
aagacgcgcagactaattcgagctcgaacaacaacaataacaataacaacacctgggatcgagggaaggatttcagaa  
ttcggtacctcttctctgtggcccaggcggccctcgagcccgaggagaagccctatgcttgtccggaatgtggttaagtccttct  
tcagagctctcacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatcttttag  
ccagtccagcaacctggtgcgccatcaacgcactcatactggcgagaagccatacaaatgtccagaatgtggcaagtcttctct  
cggcttgacaatctcgtccggcaccacgtactcacaccggggagaagccctatgcttgtccggaatgtggttaagtccttcagcc  
gcagcgataacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatcttttagc  
caggccggccacctggccagccatcaacgcactcatactggcgagaagccatacaaatgtccagaatgtggcaagtcttctct

cggtctgacaatctcgtccggcaccaacgtactcacaccggtaaaaaactagtgccaggccggccagtacccgtacgacgt  
tccggactacgct

Total: 514 bp

Primer F1-f1 of ZFPm2: 2770 bp to 2850 bp

Primer F1-f2 of ZFP m2: 2740 bp to 2790 bp

Primer F2-f of ZFP m2: 2867 bp to 2940 bp

Primer F2-b of ZFPm2: 2824 bp to 2889 bp

Primer F3-b1 ZFPm2: 2916 bp to 2973 bp

Primer F3-b2 ZFPm2: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm2: 3022 bp to 3102 bp

Primer F4-f2 of ZFPm2: 2992 bp to 3042 bp

Primer F5-f of ZFPm2: 3119 bp to 3192 bp

Primer F5-b of ZFPm2: 3076 bp to 3141 bp

Primer F6-b1 of ZFPm2: 3168 bp to 3225 bp

Primer F6-b2 of ZFPm2: 3205 bp to 3273 bp

(15) Partial sequence of pMal-m3 (1-3300 bp) and zinc finger protein ZFPm3

(2719-3270 bp) (SEQ ID NO:16):

ccgacaccatcgaatggtgcaaaaccttcgcggatggcatgatagcgcccgaagagagtcaattcagggtggt  
gaatgtgaaccagtaacgttatacgaatgctgcagagatgccggtgtctcttatcagaccgttcccgcgtggtgaaccaggcca  
gccacgtttctcgaaaacgcgggaaaaagtgaagcggcgatggcggagctgaattacattcccaaccgcgtggcacaaca  
actggcgggcaaacagtcgttgattggcgttgccacctcagcttgccctgcacgcgccgtcgcaaattgtcggcgat  
taaattcgcgccgatcaactgggtgccagcgtggtggtgctgatgtagaacgaagcggcgtcgaagcctgtaaagcggcg  
gtgcacaattcttcgcgcaacgcgtcagtggtgatcattaactatccgctggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgttcggcggtatttctgatgtcttgaccagacacccatcaacagtattatttctccatgaagacggtacgcga  
ctggcggtggagcatctggtcgcattgggtcaccagcaaatcgcgtgtagcggggccattaagttctgtctcggcgctctgc  
gtctggctggctggcataaatatctcactcgcaatcaaattcagccgatagcgaacgggaaggcgactggagtccatgtccg  
gtttcaacaacacatgcaaatgctgaatgagggcatcgttccactcgcgatgctggttccaacgatcagatggcgctggggcg  
aatgcgcgccattaccgagtcgggctgcgcgttggtcgggatctcggtagtgggatacgacgataccgaagacagctcat  
gttatatcccgccgtaaccacatcaaacaggatttcgcctgctggggcaaacagcgtggaccgcttgcgtgaactctctcag

ggccaggcgggtgaagggaatcagctgttcccgtctactggtgaaagaaaaaccaccctggcgccaatacgcaaaccg  
cctctccccgcgcgttgccgattcattaatgcagctggcacgacaggttcccgactggaaagcgggcagtgagcgcaacgc  
aattaatgtgagtagctcactcattaggcacaattctcatgtttgacagcttatcatcactgcacggcgaccaatgcttctggcgt  
caggcagccatcggaagctgtggtatggctgtgcaggtcgtaaatcactgcataattcgtgtcgtcaaggcgactcccgttct  
ggataatgtttttgcgccgacatcataacgggtctggcaaatattcgaatgagctgttgacaattaatcatcggtcgtataatgt  
gtggaattgtgagcggataacaatttcacacaggaaacagccagtcggttaggtgtttcacgagcacttcaccaacaaggacc  
atagattatgaaaactgaagaaggtaaactggtaactctggattaacggcgataaaggctataacggctcgtcgtgaagtcggtaag  
aaattcgagaaagataccggaattaaagtcaccgttgagcatccggataaactggaagagaaattcccacaggttgcggcaact  
ggcgatggccctgacattatcttctgggcacacgaccgcttgggtggctacgtcaatctggcctgttggtgaaatcaccggg  
acaaagcgttccaggacaagctgtatccgtttacctgggatgccgtacgttacaacggcaagctgattgcttaccgcatcgtgtt  
gaagcgttatcgtgtattataacaagatctgctgccgaacccgccaaaaacctgggaagagatcccgccgctggataaagaa  
ctgaaagcgaaaggtaagagcgcgctgatgttcaacctgcaagaaccgtacttcacctggccgctgattgctgctgacgggggt  
tatgcgttcaagtatgaaaacggcaagtagacattaaagacgtggcgctggataacgctggcgcgaaagcgggtctgaccttc  
ctggttgacctgattaaaaacaacacatgaatgcagacaccgattactccatcgagaagctgcctttaataaaggcgaaacag  
cgatgaccatcaacggcccggtggcatggtccaacatcgacaccagcaaagtgaattatggtgtaacggtactgccgacctca  
agggtcaaccatccaaaccgttcgttggcgtgctgagcgcaggtattaacgcccgccagtcggaacaaagagctggcaaaaga  
gttcctcgaaaactatctgctgactgatgaaggctctggaagcggtaataaagacaaaccgctgggtgccgtagcgtgaagtct  
tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaaaacgccagaaaggtgaaatcatgccgaacatcc  
cgcagatgtccgcttctggtatgccgtgctactcggtgatcaacgccgccagcggtcgtcagactgtcgtgatgaagccctga  
aagacgcgcagactaattcgagctcgaacaacaacaataacaataacaacacccgggatcgagggaaggatttcagaa  
ttcgatcctcttctctgtggcccaggcggccctcgagcccggggagaagccctatgcttgcgggaatgtgtaagtccttca  
gcgatcctggccacctggttcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatctttta  
gcaccagcggctccctggtgcgccatcaacgcactcactggcgagaagccatacaaatgtccagaatgtggcaagtccttca  
gccagagctccagcctggtgcgccaccaacgtactcacaccggggagaagccctatgcttgcgggaatgtgtaagtccttca  
gccagagcagctccctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatctttt  
agtactgccgcgacctgtcgtccatcaacgcactcactggcgagaagccatacaaatgtccagaatgtggcaagtccttct  
cccaatccagccatctcgtccggcaccaacgtactcacaccggtaaaaaactagtggccaggccggccagttaccgtacgac  
gttccggactacgt

Total: 514 bp

Primer F1-f1 of ZFPm3: 2770 bp to 2850 bp

Primer F1-f2 of ZFP m3: 2740 bp to 2790 bp

Primer F2-f of ZFP m3: 2867 bp to 2940 bp

Primer F2-b of ZFPm3: 2824 bp to 2889 bp

Primer F3-b1 ZFPm3: 2916 bp to 2973 bp

Primer F3-b2 ZFPm3: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm3: 3022 bp to 3102 bp

Primer F4-f2 of ZFPm3: 2992 bp to 3042 bp

Primer F5-f of ZFPm3: 3119 bp to 3192 bp

Primer F5-b of ZFPm3: 3076 bp to 3141 bp

Primer F6-b1 of ZFPm3: 3168 bp to 3225 bp

Primer F6-b2 of ZFPm3: 3205 bp to 3273 bp

(16) Partial sequence of pMal-m4 (1-3300 bp) and zinc finger protein ZFPm4

(2719-3270 bp) (SEQ ID NO:17):

ccgacaccatcgaatggtgcaaaaccttcgcggtatggcatgatagcgcccgaagagagtaattcagggtggt  
gaatgtgaaaccagtaacgttatacgtatgcgagatgcccgtgtctcttatcagaccgttcccgcgtggtgaaccaggcca  
gccacgtttctgcgaaaacgcgggaaaaagtgaagcggcgatggcgagctgaattacattccaaccgcgtggcacaaca  
actggcggggcaaacagtcgttgattggcgttgccacctcagctcggccctgcacgcgccgtcgcaaattgtcgcggcgat  
taaatctcgcgccgatcaactgggtgccagcgtgggtgtcgatggtagaacgaagcggcgtcgaagcctgtaaagcggcg  
gtgcacaatcttctcgcgcaacgcgtcagtggtgatcattaactaccgtggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgtccggcgttatttctgatgtctctgaccagacacccatcaacagtatttttctcccatgaagacggtacgga  
ctgggcgtggagcatctggtcgcattgggtcaccagcaaatcgcgtgttagcgggccattagttctgtctcggcgcgtctgc  
gtctggctggctggcataaatatctcactcgaatcaaattcagccgatagcgggaacgggaaggcgactggagtgccatgtccg  
gttttaacaaaccatgcaaatgctgaatgagggcatcgttccactgcgatgctggttgccaacgatcagatggcgtgggcgc  
aatgcgcgccattaccgagtcgggctgcgcgttggtgcggatatctcggtagtgggatacgacgataccgaagacagctcat  
gttatatcccgccgttaaccaccatcaaacaggatttgcctgctggggcaaaccagcgtggaccgcttgctgcaactctctcag  
ggccaggcgggtgaagggaatcagctgttggcgtctcactgggtgaaaagaaaaaccacctggcgcccaatacgcaaacgg  
cctctccccgcgcgttggccgattcattaatgcagctggcacgacaggttcccactggaaagcgggcagtgagcgaacgc  
aattaatgtgagttagctcactcattaggcacaattctcatgtttgacagcttatcatcgactgcacgggtgcaccaatgcttctggcgt  
caggcagccatcggaagctgtggtatggctgtgcaggtcgtaaatcactgcataattcgtgtcgtcgaaggcgactcccgttct  
ggataatgtttttgcgccgacatcataacggttctggcaaatattctgaaatgagctgttgacaattaatcatcggctcgataatgt

gtggaattgtgagcggataacaatttcacacaggaaacagccagtcggttaggtgtttcacgagcacttcaccaacaaggacc  
atagattatgaaaactgaagaaggtaaactggtaatctggattaacggcgataaaggctataacggctcgcgtgaagtcggttaag  
aaattcgagaaagataccggaattaaagtcaccgttgagcatccggataaactggaagagaaattcccacaggttcgggcaact  
ggcgatggccctgacattatcttctgggcacacgaccgcttgggtggctacgctcaatctggcctgttggtgaaatcaccgccg  
acaaagcgttcaggacaagctgtatccgtttacctgggatgccgtacgttacacggcaagctgattgcttaccgatcgtgtt  
gaagcgttatcgtgattataacaaagatctgctgccgaacccgccaaaacctgggaagagatccggcgctggataaagaa  
ctgaaagcgaaaggtaagagcgcgctgatgttcaacctgcaagaaccgtactcacctggccgctgattgctgctgacgggggt  
tatgcttcaagtatgaaaacggcaagtacgacattaaagacgtggcggtgataacgctggcgcgaaagcgggtctgaccttc  
ctggttgacctgattaaaaacaaacacatgaatgcagacaccgattactccatcgagaagctgcctttaataaaggcgaaacag  
cgatgacctcaacggcccgtgggcatggtccaacatcgacaccagcaaaagtgaattatggtgtaacggtactgccgacctca  
agggtcaacctccaaaccgttcgttggcgtgctgagcgcaggtattaacgccgccagtcgaacaaagagctggcaaaaga  
gttctcgaaaactatctgctgactgatgaaggctctggaagcggtaataaagacaaaccgtgggtgccgtagcgtgaagctt  
tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaaaacgccagaaagtgaaatcatccgaacatcc  
cgcagatgtccgcttctggtatgccgtgcgtactcgggtgatcaacgccgccagcggctcgtcagactgtcgtatgaagccctga  
aagacgcgcagactaattcgagctcgaacaacaacaataacaataacaacacctcgggatcgaagggaaggatttcagaa  
ttcgatcctcttctctgtggcccaggcggccctcgagcccggggagaagccctatgcttgcgggaatgtgtaagtccttca  
gccagagcagctccctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatctttt  
agccagagcagcagcctggtgcgccatcaacgcactcactaggcgagaagccatacaaatgtccagaatgtggcaagtcttctc  
agtattgtcgtgatcttgcgaggcaccaacgtactcacaccggggagaagccctatgcttgcgggaatgtgtaagtccttctc  
tcagagctctcacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatcttttag  
ccgcagcgataacctggtgcgccatcaacgcactcactaggcgagaagccatacaaatgtccagaatgtggcaagtcttctca  
acttcaggccatttggctccgtcaccaacgtactcacaccggtaaaaaactagtggccaggccggccagtagccgtacgacgtt  
ccggactacgct

Total: 514 bp

Primer F1-f1 of ZFPm4: 2770 bp to 2850 bp

Primer F1-f2 of ZFPm4: 2740 bp to 2790 bp

Primer F2-f of ZFPm4: 2867 bp to 2940 bp

Primer F2-b of ZFPm4: 2824 bp to 2889 bp

Primer F3-b1 ZFPm4: 2916 bp to 2973 bp

Primer F3-b2 ZFPm4: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm4: 3022 bp to 3102 bp

Primer F4-f2 of ZFPm4: 2992 bp to 3042 bp

Primer F5-f of ZFPm4: 3119 bp to 3192 bp

Primer F5-b of ZFPm4: 3076 bp to 3141 bp

Primer F6-b1 of ZFPm4: 3168 bp to 3225 bp

Primer F6-b2 of ZFPm4: 3205 bp to 3273 bp

(17) Partial sequence of pMal-Ap3 (1-3300 bp) and zinc finger protein ZFPAp3

(2719-3270 bp) (SEQ ID NO:18):

ccgacaccatcgaatgggtgcaaacctttcgcggtatggcatgatagcgcccggaagagagtcaattcagggtggt  
gaatgtgaaaccagtaacgttatcatgatgtcgcagagtatgccggtgtctcttatcagaccgttcccgcgtggtgaaccaggcca  
gccacgtttctgcgaaaacgcgggaaaaagtggaaagcggcgatggcggagctgaattacattccaaccgcgtggcacaaca  
actggcggggcaaacagtcgttgctgattggcgttgccacctccagtctggccctgcacgcgccgtcgcaaattgtcgcggcgat  
taaattctcgcgccgatcaactgggtgccagcgtgggtgtcgtatggtagaacgaagcggcgctgaagcctgtaaagcggcg  
gtgcacaattctctcgcgaacgcgtcagtggtgatcattaactatccgctggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgttccggcgttatttctgatgtctctgaccagacacccatcaacagtatttttctccatgaagacggtacgcga  
ctgggcgtggagcatctggctgcattgggtcaccagcaaatcgcgctgttagcggggccattaagtctgtctcggcgcgtctgc  
gtctggctggctggcataaatatctcactcgcaatcaaatcagccgatagcgggaacgggaaggcgactggagtgccatgtccg  
gtttcaacaacatgcaaatgctgaatgagggcacgttccactgcgatgctggttgccaacgatcagatggcgtgggcgc  
aatgcgcgccattaccgagtcgggctgcgcttggtgcggatatctcggtagtgggatacgacgataccgaagacagctcat  
gttatatcccgccgttaaccaccatcaaacaggatttgcctgctggggcaaacagcgtggaccgcttgctgcaactctctcag  
ggccaggcgggtgaagggaatcagctgttgcccgtctcactggtgaaaagaaaaaccacctggcgcccaatcgcaaacg  
cctctccccgcgcgttggccgattcattaatgcagctggcacgacaggttcccgactggaaagcgggcagtgagcgcaacgc  
aattaatgtgagttagctcactcattaggcacaattctcatgtttgacagcttatcatcactgcacggtgcaccaatgcttctggcgt  
caggcagccatcggaagctgtggtatggctgtgcaggtcgtaaatcactgcataattcgtgtcgtcaaggcgactcccgttct  
ggataatgtttttgcgccgacatcataacggttctggcaaatattctgaaatgagctgttgacaattaatcatcggtcgtataatgt  
gtggaattgtgagcggataacaattcacacaggaaacagccagtcggttaggtgtttcacgagcacttcaccaacaaggacc  
atagattatgaaaactgaagaaggtaaactggaatctggattaacggcgataaaggctataacggtctcgtgaagtcggttaag  
aaattcgagaaagataccggaattaaagtcaccgttgagcatccggataaactggaagagaaattcccacaggttgcggcaact  
ggcgtatggccctgacattatcttctgggcacacgaccgcttgggtggctacgctcaatctggcctgttggtgaaatcaccggg  
acaaagcgttccaggacaagctgtatccgtttacctgggatgccgtacgttacacgggaagctgattgcttaccgcatcgtgtt

gaagcgttatcgctgattataacaaagatctgctgccgaacccgccaaaaacctgggaagagatcccgccgctggataaagaa  
ctgaaagcgaaaggtaagagcgcgctgatgttcaacctgcaagaacctgacttcacctggccgctgattgctgctgacgggggt  
tatgcgttcaagtatgaaaacggcaagtacgacattaaagacgtggcgctggataacgctggcgcgaaagcgggtctgaccttc  
ctggttgacctgattaaaaacaacacatgaatgcagacaccgattactccatcgagaagctgcctttaataaaggcgaaacag  
cgatgacctcaacggcccgtgggcatggtccaacatcgacaccagcaaagtgaattatggtgtaacggtactgccgacctca  
agggtcaacctcaaacggcttggcgctgagcgcaggtattaacgcccgccagtccgaacaaagagctggcaaaaga  
gttcctcgaaaactatctgctgactgatgaaggctggaagcgggttaataaagacaaaaccgctgggtgccgtagcgcgtgaagtct  
tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaaaacgccagaaagtgaaatcatgccgaacatcc  
cgcagatgtccgcttctggtatgccgtgcgtactgcggtgatcaacgccgccagcggtcgtcagactgtcgtatgaagccctga  
aagacgcgcagactaattcgagctogaacaacaacaataacaataacaacaacctcgggatcgagggaaggatttcagaa  
ttcggtacctcttctctgtggcccaggcggccctcgagcccggggagaagccctatgcttgtccggaatgtggttaagtccttca  
gccagagcagctccctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatctttt  
agccagtcagcaacctggtgcgccatcaacgcactcacttgccgagaagccatacaaatgtccagaatgtggcaagtcttcc  
agccagtcagcaacctggtgcgccaccaacgtactcacaccggggagaagccctatgcttgtccggaatgtggttaagtccttc  
agcaccagtggctccttggttagacaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatctttt  
agccagcgcgccacacctggaacgccatcaacgcactcacttgccgagaagccatacaaatgtccagaatgtggcaagtcttt  
ctcaacttcaggcaacttggtccgtcaccaacgtactcacaccggtaaaaaactagtggccaggccggccagtacctgtacga  
cggtccggactacgt

Total: 514 bp

Primer F1-f1 of ZFP Ap3: 2770 bp to 2850 bp

Primer F1-f2 of ZFP Ap3: 2740 bp to 2790 bp

Primer F2-f of ZFP Ap3: 2867 bp to 2940 bp

Primer F2-b of ZFP Ap3: 2824 bp to 2889 bp

Primer F3-b1 ZFP Ap3: 2916 bp to 2973 bp

Primer F3-b2 ZFP Ap3: 2953 bp to 3021 bp

Primer F4-f1 of ZFP Ap3: 3022 bp to 3102 bp

Primer F4-f2 of ZFP Ap3: 2992 bp to 3042 bp

Primer F5-f of ZFP Ap3: 3119 bp to 3192 bp

Primer F5-b of ZFP Ap3: 3076 bp to 3141 bp

Primer F6-b1 of ZFP Ap3: 3168 bp to 3225 bp



Primer F6-b2 of ZFPAp3: 3205 bp to 3273 bp

(18) Sequence of oligo m12 (SEQ ID NO:19):

Biotin-GGa gcc tcc ttc ctc ctc tca ctc GGG TTTT CCC gag tga gag gag gaa gga  
ggc tCC

Total: 58 bp

Lower case sequence: ZFPm1 and ZFPm2 binding site m12

(19) Sequence of oligo m34 (SEQ ID NO:20):

Biotin-GGa gcc aac tac tac ggc tcc ctc acc GGG TTTT CCC ggt gag gga gcc gta  
gta gtt ggc tCC

Total: 58 bp

Lower case sequence: ZFPm3 and ZFPm4 binding site m34

(20) Sequence of oligo Ap3 (SEQ ID NO:21):

Biotin-GGt tac ttc ttc aac tcc atc GGG TTTT CCC gat gga gtt gaa gaa gta aCC

Total: 52 bp

Lower case sequence: ZFPAp3 binding site

(21) Sequence of oligo NRI-1 (SEQ ID NO:22):

Biotin-GG ttc tac ccc tcc cac cgc GGG TTTT CCC gcg gtg gga ggg gta gaa CC

Total: 51 bp

(22) Sequence of oligo NRI-2 (SEQ ID NO:23):

Biotin-GG tgc ggc gac tgc agc agc GGG TTTT CCC gct gct gca gtc gcc gca CC

Total: 51 bp

(23) Sequence of oligo hHD-I (SEQ ID NO:24):

Biotin-GG ggc ccc gcc tcc gcc ggc GGG TTTT CCC gcc ggc gga ggc ggg gcc  
CC

Total: 51 bp

(24) Sequence of oligo hHD-II (SEQ ID NO:25):

Biotin-GG ggc agc ccc cac ggc gcc GGG TTTT CCC ggc gcc gtg ggg gct gcc CC

Total: 51 bp

(25) Sequence of oligo c5p1-g (SEQ ID NO:26):

Biotin-GG gac acc ccc aac ccc gcc GGG TTTT CCC ggc ggg gtt ggg ggt gtc CC

Total: 51 bp

(26) Sequence of oligo c5p3-g (SEQ ID NO:27):

Biotin-GG ctc tgc tca tcc cac tac GGG TTTT CCC gta gtg gga tga gca gag CC

Total: 51 bp

(27) Sequence of oligo B3c2 (SEQ ID NO:28):

Biotin-GG acc cac cgc gtc ccc tcc GGG TTTT CCC gga ggg gac gcg gtg ggt CC

Total: 51 bp

(28) Sequence of oligo e2c-g (SEQ ID NO:29):

Biotin-GG cac tgc ggc tcc ggc ccc GGG TTTT CCC ggg gcc gga gcc gca gtg CC

Total: 51 bp

(29) Sequence of primer Ap3-F (SEQ ID NO:30):

GGCGAGAGGGAAGATCCAG

Total: 19 bp

(30) Sequence of primer NZlib5' (SEQ ID NO:31):

GGCCCAGGCGGCCCTCGAGC

Total: 20 bp

(31) Sequence of primer Ap3f4-R (SEQ ID NO:32):

CTCCTCTAATACGACTCACTATAGGGACACTCACCTAGCCTCTG

Total: 44 bp

(32) Sequence of primer m4f3-R (SEQ ID NO:33):

CCTCGCAAGATCACGACAATC

Total: 21 bp

(33) Sequence of quantitative PCR probe for AP3 (SEQ ID NO:34):

CCATTTCATCCTCAAGACGACGCAGCT

Total: 27 bp

(34) Sequence of quantitative PCR primer for AP3 (Forward) (SEQ ID NO:35):

TTTGGACGAGCTTGACATTGAC

Total: 22 bp

(35) Sequence of quantitative PCR primer for AP3 (Reverse) (SEQ ID NO:36):

CGCGAACGAGTTTGAAAGTG

Total: 20 bp

(36) Sequence of 2C7-SID (Figure 3) (SEQ ID NO:66):

gacggatcgggagatctcccgatcccctatggcgcactctcagtacaatctgctctgatgcccatagttaagccagta  
tctgctccctgcttgtgtgtggaggtcgtgagtagtgccgcagcaaaatttaagctacaacaaggcaaggcttgaccgacaatt  
gcatgaagaatctgcttagggtaggcgttttgcgctgcttcgcgatgtacgggccagatatacgcggtgacattgattattgacta  
gttattaatagtaataattacgggggtcattagttcatagcccatatatggagtccgcgttacataacttacggtaaaggccgcct  
ggctgaccgccaacgacccccgccattgacgtcaataatgacgtatgtcccatagtaacgccaatagggaacttccattgac  
gtcaatgggtggactattacggtaaactgccacttggcagtagcatcaagtgtatcatatgccaagtagccccctattgacgtca  
atgacggtaaaggccgcctggcattatgccagtagcatgacattatgggactttctacttggcagtagcatctacgtattagtc  
cgctattaccatggtgatgcggttttggcagtagcatcaatggcggtggatagcggttgactacggggatttccaagtcacc  
ccattgacgtcaatgggagtttgtttggcaccaaaatcaacgggactttccaaatgtcgtacaactccgccccattgacgcaa  
atggcggttagcggtgtacgggtgggaggtctatataagcagagctctctggctaactagagaaccactgcttactggttatcg  
aaattaatacgaactactataggagaccaagctggctagcatggccgctgccgtgcgatgaacatccagatgctgctcgaa  
gccgctgattatctggaacgccgggagcgcgaagccgagcacggctacgccagcatgctgccatatccgaaaagaaacgc  
aaggtggccaggcggccctcagccctatgcttgcctgtcgaagtcctgcgatcgccgcttttctaagtcggctgatctgaagc  
gccatatccgcattccacagggcagaagcccttccagtgctgaatatgcatgcgtaacttcagtcgtagtgaccacctaccac  
ccacatccgcacccacacaggcgagaagcccttttgcctgtgacatttggggaggaagtttccaggagtgatgaacgcaaga  
ggcataccaaaatccataccggtgagaagccctatgcttgcctgtcgaagtcctgcgatcgccgcttttctaagtcggctgatctg  
aagcgccatatccgcattccacagggcagaagcccttccagtgctgaatatgcatgcgtaacttcagtcgtagtgaccacctta  
ccaccacatccgcacccacacaggcgagaagcccttttgcctgtgacatttggggaggaagtttccaggagtgatgaacgca  
agaggcataccaaaatccatttaagacagaaggactctagaactagtggccaggccggccagtagccgtacgacgttccggac

tacgcttcttgaaagcttggtaccgagctcggatccactagtcagtggtggaattctgcagatatccagcacagtggcggcc  
gctcgagctagagggcccggttaaacccgctgatcagcctcagctgtccttctagttgccagccatctgttggttccccctccc  
cgtgccttcttgacctggaaggtgccactcccactgtccttcttaataaaatgaggaaattgcacgcattgtctgagtaggtgt  
cattctattctgggggtggggtggggcaggacagcaagggggaggattgggaagacaatagcaggcatgctggggatgcg  
gtgggctctatggcttctgaggcggaagaaccagctggggctctaggggtatccccacgcgcctgtagcggcgcatatag  
cgcggggggtgtggtgttacgcgcagcgtgaccgtacacttgcagcgccctagcggcgctccttctgcttcttcccttct  
ttctgccacgttcggcgcttccccgtcaagctctaaatcggggcatcccttaggggtccgatttagtgccttacggcacctcga  
ccccaaaaaacttgattaggtgatggtcacgtagtgggccatcgccctgatagacggttttcggcctttgacgttgagtcac  
gttcttaatagtggactctgttccaaactggaacaacactcaacccatctcgggtctattctttgattataagggatttgggattt  
cggcctattggttaaaaaatgagctgatttaaaaaatataacgcgaattaattctgtggaatgtgtgtagttaggtgtggaag  
tccccagggtccccaggcaggcagaagtatgcaaagcatgcattcaattagtcagcaaccagggtgtggaagtcccccagggt  
ccccagcaggcagaagtatgcaaagcatgcattcaattagtcagcaaccatagtcggcgccctaaactccgcccacccgcccc  
taactccgcccagttccgcccattctccgcccattggtgactaattttttatgtagagggccgaggccgctctgctctga  
gctattccagaagtgtgaggaggcttttggaggcctaggttttcaaaaagctccgggagcttgatatccatttccggtatc  
gatcagcacgtgttgacaattaatcatcggcatagatatcgcatagataatacgaaggtgaggaactaaaccatggccaa  
gttgaccagtgcggttccggtgtcaccgcgcgcgacgtcggcgagcgggtcagttctggaccgaccgggtcgggtctccc  
gggacttctgtggaggacgacttccggtgtgttccgggacgacgtgacctgtcatcagcgcggtccaggaccagggtgt  
gccggacaacacctggcctgggtgtggtgtgcgcggcctggacgagctgtacggcgagtggtcggaggctgtgtccacgaa  
cttccgggacgctccggcgccgcatgaccgagatcgccgagcagcgtggggcgggagttcgccctgcgcgaccggg  
ccggcaactgcgtgcacttctgtggcgaggagcaggactgacacgtgctacgagatttcgattccaccgcccgttctatgaaa  
ggttgggcttcggaatcgtttccgggacgcccgttgatgatctccagcgcggggaatcatgctggagttctcggccacc  
caactgtttattgcagcttataatggttacaataaagcaatagcatcacaaatttcacaataaagcatttttctactgcattctagt  
gtggttctgcaaactcatcaatgtatcttatcatgtctgtataccgtcgacctctagctagagcttggcgtaatcatggtcatagctgt  
ttcctgtgtgaaattgtatccgtcacaaattccacacacatacagccggaagcataaagtgtaaagcctgggggtgcctaatga  
gtgagctaaactacattaattgcgttgcgtcactgcccgtttccagtcgggaaacctgtcgtgccagctgcatatgaatcggc  
caacgcgcggggagaggcggttgcgtattggcgcttctccgcttccgctcactgactcgtgcgtcgggtcgttcgggtgc  
ggcgagcgggtatcagctcactcaaaggcggtatccacagaatcaggggataacgcaggaaagaacatgtgagc  
aaaaggccagcaaaaggccaggaaccgtaaaaaggcggttgcgttgcgttttccataggctccgccccctgacgagcatc  
acaaaaatcgacgtcaagtcagaggtggcgaaacccgacaggactataaagataaccaggcggttccccctggaagctccctc  
gtgcgtctcctgttccgacctgcccgttaccggatacctgtccgcttctccctcgggaagcggtggcgcttctcaatgtc  
cgctgtaggtatctcagttcgggtgtaggtcgttcgtccaagctgggtgtgtgcacgaacccccgttcagccccaccgctgcg  
ccttatccggtactatcgtctgtagccaacccggttaagcacgacttatccactggcagcagccactggtaacaggattag  
cagagcgaggtatgtagcggtgtacagagttctgaagtgttgccctaactacggctacactagaaggacagtatttggatc  
tgcgtctgtgaagccagttaccttcggaaaaagagttgtagcttctgatccggcaaaaccaccgctggtagcggtgtt  
ttttgtttgcaagcagcagattacgcgcagaaaaaaggatctcaagaagatccttctatcttctacggggctgtgacgtcagtg  
gaacgaaaactcacgttaagggttttggctatgagattatcaaaaaggatcttcacctagatccttttaattaaaaatgaagttta  
aatcaatctaaagtatatatgagtaaaacttggtctgacagttaccaatgcttaatcagtgaggcacctatctcagcgtatgtctattc  
gttcatccatagttgcttactccccgtcgtgtagataactacgatacgggagggttaccatctggccccagtgctgcaatgata  
ccgcgagaccacgctcaccggctccagatttatcagaataaaccagccagccggaaggccgagcgcagaagtggctct  
gcaactttatccgctccatccagctctattaattgttccgggaagctagagtaagtgtccagttatagtttgcgaacgtgt  
tgccattgtacaggcatcgtggtgtcacgctcgtcgttggtaggttcttctcagctccggttcccaacgatcaaggcgagttac  
atgatccccatgttgtgcaaaaaagcggttagctccttcggtcctccgatcgtgtcagaagtaagttggccgagtggtatcact  
catggttatggcagcactgcataattcttactgtcatgccatccgtaagatgctttctgtacttggtgagtactcaaccaagtcat  
ctgagaatagtgtatcgggcgaccgagttgcttggccggcgtcaatacgggataataccgcgccacatagcagaactttaaa  
gtgctcatcattgaaaaacgttctcggggcgaaaaactcgaaggatcttaccgctgttgagatccagttcgtatgaacccactcgt  
gcaccaactgatcttcagcatctttacttaccagcggttctgggtgagcaaaaacaggaaggcaaaatgccgcaaaaaagg

gaataagggcgacacggaaatgtgaatactcatactcttccttttcaatattattgaagcattatcagggtattgtctcatgagcg  
gatacatattgaatgtatttagaaaaataaacaatataggggtccgcgcacattccccgaaaagtgccacctgacgtc

Figure 24

(1) Sequence of promoter CsVMV (Example 1A) (SEQ ID NO:1):

Tctagaaactagcttcagaaggaattatccaagatgtagcatcaagaatccaatgtttacgggaaaaactatggaa  
gtattatgtgagctcagcaagaagcagatcaatatcgccacatatgcaacctatgttcaaaaatgaagaatgtacagatacaag  
atcctatactgccagaatacgaagaagaatacgtagaaattgaaaaagaagaaccaggcgaagaaaagaatcttgaagacgta  
agcactgacgacaacaatgaaaagaagaagataaggtcgggtgattgtgaaagacatagaggacacatgaagggtgaaaa  
tgaaggcggaagtaacctatcacaaaggaatcttccccactacttatcctttatattttccgtgtcattttgcccttgagt  
ttcctataaaggaaccaagttcggcattgtgaaaacaagaaaaatttggtgtaagctattttcttgaagtactgaggatacaact  
tcagagaaattgtaagttgta

Total 531 bp

(2) Sequence of zinc finger protein 2C7 binding site (Example 1A) (SEQ ID NO:2):

GCG TGG GCG GCG TGG GCG

Total 18 bp.

(3) Sequence of promoter pc7rbTATA (Example 1A) (SEQ ID NO:3):

Cccgggtatataataagcttggcattccgggtactgttggttaaagccacat

Total 51 bp.

(4) Sequence of pND3008 coding region (Example 1B) (SEQ ID NO:4):

agcgtgaccggctcgtccccctctagagataatgagcattgcatgtctaagttataaaaaattaccacatattttttg  
tcacacttggttgaagtgcagtttatctatctttatcacatatatttaactttactctacgaataataatctatagtactacaataatca  
gtgttttagagaatcatataaatgaacagttagacatggtctaaaggacaattgagtatttgacaacaggactctacagtttatcttt  
ttagtgtgcatgtgttccttttttttgcaaatagcttcacctatataatacttcacccattttatttagtacatccatttagggtttagggtt  
aatggttttatagactaatttttttagtacatctattttattctatttttagcctctaaattaagaaaactaaaactctatttttagtttttttta  
ataatttagatataaaatagaataaaataaagtgactaaaaattaacaaataaccctttaagaaattaaaaaactaaggaaacatttt  
tcttgtttcgagtagataatgccagcctgttaaacgccgtcgacgagttaacggacaccaaccagcgaaccagcagcgtcgcg  
tcgggccaagcgaagcagacggcacggcatctctgtcgtcctctggacccctctcgagagttccgctccaccgttggaacttg  
ctccgctgtcggcatccagaaattgcgtggcgggagcggcagacgtgagccggcacggcaggcggcctcctcctcctcacg  
gcacggcagctacgggggattcctttcccaccgctccttcgctttcccttcctcgcccgccgtaataaatagacacccctccaca

ccctctttccccaacctcgtgtgttcggagcgcacacacacaaccagatctccccaatccaccggtcggcacctccgctt  
 caaggtagccgctcgtcctccccccccccctctctaccttctctagatcggcgtccggtccatggtagggcccgtagtgc  
 tacttctgttcatgtttgtgtagatccgtgttgtgtagatccgtgctgtagcgttcgtacacggatgcgacctgtacgtcagacac  
 gttctgattgctaactgccagtgtttctcttggggaatcctgggatggctctagccgttcgcagacgggatcgattcatgatttt  
 tttgttctgtgcatagggtttgtttgcccttttcttattcaataatgccgtgcacttgtttgtcgggtcatctttcatgctttttgt  
 cttgggtgtgatgatgtggtctggttggcggtcgttctagatcggagtagaattctgttcaaactacctggtggattattaattttg  
 atctgtatgtgtgtccatacatattcatagttacgaattgaagatgatggatggaaatcgcgtcaggataggtatacatgttgatg  
 cgggttttactgatgcataacagagatgctttttgttcgcttgggtgtgatgtggtgtggttggcggtcgttcattcgttctagat  
 cggagtagaatactgttcaaactacctggtgtattattaattttggaactgtatgtgtgtgcatacatcttcatagttacgagtttaag  
 atggatggaaatcgcgtcaggataggtatacatgttgatgtgggttttactgatgcatacatgatggcatatgcagcatctattc  
 atatgctctaaccttgagtacctatctattataataaacaagatgtttataatttttgatcttgatatacttggatgatggcatatgca  
 gcagctatatgtggatttttttagccctgccttcatacgccttattttgcttggtagtcttctttgtcgatgctcaccctgtgttgggt  
 tacttctgcaggctgactctagaggatctatggcccaggcggccctcgcgtccctatgcttgcctgtcgagtcctgcgatcgc  
 cgcttttctaagtcggctgatctgaagcgccataccgcatccacacaggccagaagcccttccagtgtcgaatatgcagcgtaa  
 cttcagtcgtagtgaccaccttaccacccacatccgcacccacacaggcgagaagccttttgcctgtgacatttgtgggaggaag  
 ttgcccaggagtgaacgcaaggagcataccaaaatccataccggtgagaagccctatgcttgcctgtcgagtcctgcgatc  
 gccgcttttctaagtcggctgatctgaagcgccataccgcatccacacaggccagaagcccttccagtgtcgaatatgcagcgt  
 aacttcagtcgtagtgaccaccttaccacccacatccgcacccacacaggcgagaagccttttgcctgtgacatttgtgggagga  
 agtttcccaggagtgaacgcaaggagcataccaaaatccatttaagacagaaggactctagaactagtggccaggccggc  
 caggctagcccgaaaaagaaacgcaaagttggcgcgccgacgcgctggacgatttcgatctcgacatgctgggttctgatgc  
 cctcgatgactttgacctggatatgttgggaagcgacgcattggatgactttgatctggacatgctcggctccgatgctctggacg  
 atttcgatctcgatatgttaattaactaccgtagcaggttccggactacgcttcttgaattcgcggccgcgggcccgagcctag  
 ggaggagctcaagatccccgaattccccgatcgttcaaacatttgcaataaagtttctaagattgaatcctgttccggtcttg  
 cgatgattatcatctaatttctgtgaattacgttaagcatgtaataattaacatgtaatgcaggtatttatgagatgggttttatga  
 ttagagtcgccgaattatacatttaatacgcgatagaaaacaaaatatagcgcgcaaactaggataaattatcgcgcggtgtca  
 tctatgttactagatccgggaattgggtac

Total:	3120 bp
ZmUbi promoter:	44 bp to 2026 bp
Six finger ZFP2C7:	2060 bp to 2588 bp
Nuclear localization signal:	2620 bp to 2641 bp
VP64 activation domain:	2641 bp to 2805 bp

HA epitope tag: 2805 bp to 2836 bp  
Nos terminator: 2884 bp to 3164 bp

(5) Sequence of pND3018 coding region (Example 1B) (SEQ ID NO:5):

agcgtgacccggctgctgccccctctagagataatgagcattgcatgtctaagttataaaaaattaccacatattttttg  
tcacactgtttgaagtgcagttatctatctttatacatattttaaactttactctacgaataatataatctatagtactacaataatca  
gtgttttagaatacataaaatgaacagttagacatggctctaaaggacaattgagtatttgacaacaggactctacagttttatctt  
ttagtgtgcatgtgttctctttttttgcaaatagcctcacctatataataacttcatccattttattagtagatccatttagggtttaggg  
aatggttttatagactaatttttttagtagatctattttattctattttagcctctaaattaagaaaactaaaactctatttttagtttttattta  
ataatttagatataaaatagaataaaataaagtactaaaaataaacaataacccttaagaaataaaaaactaaggaaacattt  
tcttgttcgagtagataatgccagcctgttaaacgccgtcgacgagtctaacggacaccaaccagcgaaccagcagcgtcgcg  
tcgggccaagcgaagcagacggcacggcatctctgtcgtgcctctggacccctctcgagagttccgtccaccgttgacttg  
ctccgtgtcggcatccagaaattgcgtggcggagcggcagacgtgagccggcacggcaggcggcctctctctctcag  
gcacggcagctacgggggattcctttccaccgctccttcgtttccctcctcggccgtaataatagacacccctccaca  
ccctctttcccaacctcgtgttggtcggagcgacacacacacaaccagatctccccaatccaccgctcggcacctccgctt  
caaggtagccgctcgtctccccccccccctctctacctctctagatcggcgttccgggtccatggtagggcccggtagttc  
tacttctgttcatgtttgtgttagatccgtgttgtgttagatccgtgctgtagcgttgtagacggatgcgacctgtacgtcagacac  
gttctgattgctaacttgccagtggttctctttggggaatcctgggatggctctagccgttccgagacgggatcattcatgatttt  
ttgttctggtcatagggttggttgcccttttcttttatttcaatatatgccgtgcacttgtttgtcgggtcatctttcatgcttttttgt  
cttggttgatgatgtggtctggttggcggtcgtttagatcggagtagaattctgttcaaactacctggtggatttataattttg  
atctgtatgtgtgcatatattcatagttacgaattgaagatgatggatggaaatcgcgatctaggataggtatacatgttgatg  
cgggttttactgatcatatacagagatgctttttgtcgttggttgatgatgtggtgtggttggcggtcgttcattcgttctagat  
cggagtagaataactgttcaaactacctggtgtatttataattttggaactgtatgtgtgtcatatcttcatagttacgagtttaag  
atggatggaaatcgcgatctaggataggtatacatgttgatgtgggttttactgatgcatatacatgatggcatatgcagcatctattc  
atatgctctaacctgagtagctatctattataataaacaagtatgtttataatttttgatcttgataacttggtgatggcatatgca  
gcagctatatgtgatttttttagccctgccttcatacgctatttttgccttggtactgtttctttgtcgatgctaccctgttggtgtg  
tacttctgcaggtcgactctagaggatccactagttagccatgggctagcatggccgtgccgtgcgcatgaacatccagatgt  
gctcgaagccgctgattatctggaacgccgggagcgcgaagccgagcacggctacgccagcatgctgccatatccgaaaaag  
aaacgcaaggtggcccaggcggccctcgagctcccctatgcttgcctgtcgagtcctgcgatcgccgcttttctaagtcgggtg  
atctgaagcgccatatccgcatccacacaggccagaagcccttcagtgatgaatatgcatgcgtaacttcagtcgtagtacca  
ccttaccacccacatccgcacccacacaggcgagaagccctttgcctgtgacatttgtgggaggaagtttgccaggagtgtgaa



cgcaagaggcataccaaaatccataccggtgagaagccctatgcttgcctgtcgagtcctgcgatgccgcttttctaagtcgg  
ctgatctgaagcgccatatccgcatccacacaggccagaagccctccagtgatgaatgcatgcgtaacttcagtcgtagtga  
ccaccttaccacccacatccgcacccacacaggcgagaagcctttgcctgtgacatttggggaggaagtttgcaggagtgat  
gaacgcaagaggcataccaaaatccatttaagacagaaggactctagaactagtgccaggccggccagtaccgtagcagc  
ttccggactacgcttcttgaagcttggtaccgagctcggatccccgaatttcccgatcggtcaaactttggcaataaagtttct  
aagattgaatcctgttgcggcttgcgatgattatcatctaatttctgtgaattacgttaagcatgtaataattaacatgtaatgatg  
acgttatttatgagatgggttttatgattagagtcgccgaattatacatttaacgcgatagaaaacaaaatatagcgcgcaaaacta  
ggataaattatcgcgcgcggtgtcatctatgttactagatccgggaattccggaccggtaccagcgcc

Total:	3068 bp
ZmUbi promoter:	44 bp to 2026 bp
SID repression domain:	2066 bp to 2173 bp
Nuclear localization signal:	2174 bp to 2194 bp
Six finger ZFP2C7:	2207 bp to 2735 bp
HA epitope tag:	2762 bp to 2791 bp
Nos terminator:	2820 bp to 3112 bp

(6) Sequence of 6X2C7 binding site (SEQ ID NO:6):

Cgtgctagcgcgtggcgccgtgggcgaacaagcgtggcgccgtgggcgaacaagcgtggcgccgtgggc  
gactagtctagcgcgtggcgccgtgggcgaacaagcgtggcgccgtgggcgaacaagcgtggcgccgtgggcgac  
tagtg

Total: 155 bp

(7) Sequence of 3 finger protein C7: (SEQ ID NO: 73)

Atggcccaggcgccctcgagccctatgcttgcctgtcgagtcctgcgatgccgcttttctaagtcggctgatctg  
aagcgccatatccgcatccacacaggccagaagccctccagtgatgaatgcatgcgtaacttcagtcgtagtaccacctta  
ccacccacatccgcacccacacaggcgagaagcctttgcctgtgacatttggggaggaagtttgcaggagtgatgaacgca  
agaggcataccaaaatccatttaagacagaaggactctagaactagtgccaggccggccaggctagc

Total: 314 bp

(8) Amino acid sequence of 3 finger protein C7: (SEQ ID NO: 74)

Maqaalepyacpvescdrrfsksadlkrhrihtgqkpfqcrimmmfsrsdhlththrtgkpfacdicgrkfar  
sderkrhtkihlrqkdsrtsgqagqas

Total: 105 aa

(9) Sequence of zinc finger protein ZFPap3 binding site:

GAT GGA GTT GAA GAA GTA (SEQ ID NO: 7)

Total: 18 bp

(10) Sequence of zinc finger protein ZFPm1 and ZFPm2 binding site m12:

GCC TCC TTC CTC CTC TCA CTC (SEQ ID NO: 8)

Total: 21 bp

ZFPm1 binding site: compliment strand of 1 to 18

ZFPm2 binding site: compliment strand of 4 to 21

(11) Sequence of zinc finger protein ZFPm3 and ZFPm4 binding site m34:

GCC AAC TAC TAC GGC TCC CTC ACC (SEQ ID NO: 11)

Total: 21 bp

ZFPm3 binding site: compliment strand of 1 to 18

ZFPm4 binding site: compliment strand of 7 to 24

(12) Partial sequence of pMal-m1 (1-3300 bp) and zinc finger protein ZFPm1

(2719-3270 bp) (SEQ ID NO: 14):

ccgacaccatcgaatggtgcaaaaccttcgcggtatggcatgatagcggcgaagagagtcattcagggtggt  
gaatgtgaaaccagtaacgttatacgtatgctgcagagatgcccgtgtctcttatcagaccgtttcccgcgtggtgaaccaggcca  
gccacgtttctgcgaaaacgcgggaaaaagtggagcggcgatggcggagctgaattacattccaaccgcgtggcacaaca  
actggcgggcaaacagtcgttgctgattggcgttgccacctccagctggccctgcacgcgccgtcgcaaatgtcgcggcgat  
taaatctcgcgccgatcaactgggtgccagcgtggtggtgctgatggtagaacgaagcggcgtcgaagcctgtaaagcggcg  
gtgcacaatcttctcgcgaacgcgtcagtggtggtgattacattatccgtggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgttccggcggtattttctgatgtctctgaccagacaccatcaacagtatttttctccatgaagacggtacgcga  
ctggcggtggagcatctggtcgattgggtcaccagcaaatcgcgctgtagcgggccattaagtctgtctcggcgctctgc  
gtctggctggctggcataaatatctcactcgcaatcaaattcagccgatagcgggaacgggaaggcgactggagtgccatgtccg

gtttcaacaaaccatgcaaatgctgaatgagggcatcgttcccactgcgatgctggttgccaacgatcagatggcgctgggcgc  
aatgcgcgccattaccgagtcgggctgcgcgttggtgcggatactcggtagtgggatacgacgataccgaagacagctcat  
gttatatcccgccgttaaccacatcaaacaggatttcgcctgctggggcaaaccagcgtggaccgcttgctgcaactctctcag  
ggccaggcgggtgaagggaatcagctgttgcctcactggtgaaaagaaaaaccacctggcgcccaatacgcaaacg  
cctctccccgcgcgttgccgattcattaatgcagctggcacgacaggttcccactggaaagcgggcagtgagcgcaacgc  
aattaatgtgagtagctcactcattaggcacaattctcatgtttgacagcttatcatcgactgcacggtgcaccaatgcttctggcgt  
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gaagcgttatcgctgattataacaaagatctgctgccgaacccgcaaaaacctgggaagagatcccggcgtggataaagaa  
ctgaaagcgaaggtaagagcgcgctgatgttcaacctgcaagaaccgtacttcacctggccgctgattgctgctgacgggggt  
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ctggttgacctgattaaaaacaacacatgaatgcagacaccgattactccatcgagaagctgccttaataaaggcgaaacag  
cgatgaccatcaacggcccggtggcatggtccaacatcgacaccagcaaagtgaattatggtgtaacggtactgccgacctca  
agggtcaaccatccaaaccgttgcgtggcgctgctgagcgcaggtattaacgccgccagtcggaacaaagagctggcaaaaga  
gttccctcgaaaactatctgctgactgatgaaggctggaagcggtaataaagacaaaccgctgggtgccgtagcgtgaagctt  
tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaaaacgccagaaaggtgaaatcatgccgaacatcc  
cgcagatgtccgcttctgtatgccgtgcgtactcgggtgatcaacgccgccagcggctcagactgtcgtatgaagccctga  
aagacgcgcagactaattcgagctcgaacaacaacaataacaataacaacacctcgggatcgagggaaggatttcagaa  
ttcggatcctcttctctgtgcccaggcggccctcgagccggggagaagccctatgcttgcgggaatgtgtaagtcttctc  
tcagagctctcacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtcgggcaaatcttttag  
ccagtccagcaacctggtgcgccatcaacgcactcactggcgagaagccatacaaatgtccagaatgtggcaagtcttctct  
cggctcgacaatctcgtccggcaccaacgtactcacaccggggagaagccctatgcttgcgggaatgtgtaagtcttctcagcc  
gcagcgataacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtcgggcaaatcttttagc  
caggccggccacctggccagccatcaacgcactcactggcgagaagccatacaaatgtccagaatgtggcaagtcttctct  
cggctcgacaatctcgtccggcaccaacgtactcacaccggtaaaaaactagtggccaggccggccagtagccgtacgacgt  
tccggactacgt

Total: 514 bp

Primer F1-f1 of ZFPm1: 2770 bp to 2850 bp

Primer F1-f2 of ZFPm1: 2740 bp to 2790 bp

Primer F2-f of ZFPm1: 2867 bp to 2940 bp

Primer F2-b of ZFPm1: 2824 bp to 2889 bp

Primer F3-b1 ZFPm1: 2916 bp to 2973 bp

Primer F3-b2 ZFPm1: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm1: 3022 bp to 3102 bp

Primer F4-f2 of ZFPm1: 2992 bp to 3042 bp

Primer F5-f of ZFPm1: 3119 bp to 3192 bp

Primer F5-b of ZFPm1: 3076 bp to 3141 bp

Primer F6-b1 of ZFPm1: 3168 bp to 3225 bp

Primer F6-b2 of ZFPm1: 3205 bp to 3273 bp

(13) Sequence of zinc finger protein ZFPm1

(Translated from pMal-m1: 2719-3270 bp): (SEQ ID NO: 75)

Aqaalepgekpyacpecgksfsdpghlvhrhqrthtgekpykpecgksfsqrahlrhrthtgekpykpec  
gksfsqssnlvrhqrthtgekpyacpecgksfsrdnlvrhqrthtgekpykpecgksfsrdnlvrhqrthtgekpykpe  
cgksfsqaghlashqrthtgkktsgqag

(14) Partial sequence of pMal-m2 (1-3300 bp) and zinc finger protein ZFPm2

(2719-3270 bp) (SEQ ID NO:15):

ccgacaccatcgaatggtgcaaacctttcgcggtatggcatgatagcgcccggaagagagtaattcagggtggt  
gaatgtgaaaccagtaacgttatcatgatgtcgcagagtatgccggtgtctcttatcagaccgtttccgcgtggtgaaccaggcca  
gccacgtttctgcgaaaacgcgggaaaaagtgggaagcggcgatggcggagctgaattacattccaaccgcgtggcacaaca  
actggcgggcaaacagtcgttgctgattggcgttgccacctccagcttgccctgcacgcgccgtcgcaaattgtcgcggcgat  
taaattctcgcgccgatcaactgggtgccagcgtggtggtgcatggtagaacgaagcggcgctgaagcctgtaaagcggcg  
gtgcacaatcttctcgcgcaacgcgtcagtggtgatcattaactatccgctggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgtccggcggtatttcttgatgtctctgaccagacacccatcaacagtatttttctcccatgaagacggtacgcga  
ctgggcgtggagcatctggtcgcattgggtcaccagcaaatcgcgctgttagcggggccattaagtctgtctcggcgcgctctgc

gtctggctggctggcataaatctcactcgcaatcaaattcagccgatagcggaaacgggaaggcgactggagtgccatgtccg  
gtttcaacaaacatgcaaatgctgaatgagggcatcgttcccactgcgatgctggttgccaacgatcagatggcgctgggcgc  
aatgcgcgccattaccgagtcgggctgcgcgttggtgcggatatctcggtagtggtgatacgcgataccgaagacagctcat  
gttatatcccgccgttaaccaccatcaaacaggatttgcctgctggggcaaacaggcgtggaccgcttgctgcaactctctcag  
ggccaggcgggtaagggaatcagctgttcccgtctcactggtgaaaagaaaaaccacccctggcgcccaatacgcgaacgg  
cctctccccgcgcgttggccgattcattaatgcagctggcacgacaggttccccgactggaaagcgggagtgagcgcaacgc  
aattaatgtgagttagctcactcattaggcacaattctcatgtttgacagcttatcatcgactgcacgggtgcaccaatgcttctggcgt  
caggcagccatcggaagctgtggtatggctgtgcaggtcgtaaatcactgcataattcgtgctgctcaaggcgcactcccgttct  
ggataatgtttttgcgccgacatcataacggttctggcaaatattctgaaatgagctgttgacaattaatcatcggtcgtataatgt  
gtggaattgtgagcggataacaatttcacaggaacagccagtcggttaggtgtttcacgagcacttcaccaacaaggacc  
atagattatgaaaactgaagaaggtaaaactggtaacttggaataacggcgataaaggctataacggctcgcgtgaagtcggtaag  
aaattcgagaaagataccggaattaaagtcaccgttgagcatccggataaactggaagagaaattccacaggttgcggcaact  
ggcgatggccctgacattatcttctgggcacacgaccgcttgggtggctacgctcaatctggcctgttggtgaaatcaccccg  
acaaagcgttccaggacaagctgtatccgtttacctgggatgccgtacgttacaacggcaagctgattgcttaccgatcgtgtt  
gaagcgttatcgctgattataacaaagatctgctgccgaacccgccaaaaacctgggaagagatcccggcgtggataaagaa  
ctgaaagcgaaaggaagagcgcgtgatgttaacctgcaagaaccgtacttcacctggccgctgattgctgctgacgggggt  
tatgcttcaagtatgaaaacggcaagtacgacattaaagacgtggcggtggataacgctggcgcgaaagcgggtctgaccttc  
ctggttgacctgattaaaaacaacacatgaatgcagacaccgattactccatcgagaagctgcctttaaaagcggaacag  
cgatgaccatcaacggcccggtggcatggccaacatcgacaccagcaaaagtgaattatggtgtaacggtactgccgacctca  
agggtcaaccatccaaaccgttctgttggcgtgctgagcgcaggtattaacgccgccagtcgaacaaagagctggcaaaaga  
gttctctgaaaactatctgctgactgatgaaggcttggaaagcggtaataaagacaaaccgctgggtgccgtagcgtgaagctt  
tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaaaacgccagaaaggtgaaatcatgccgaacatcc  
cgcatgtccgcttctgtgtatgccgtgctactcggtgatcaacgccgccagcggctcgtcagactgtcgtgatgaagccctga  
aagacgcgcagactaattcgagctcgaacaacaacaataacaataacaacaacctcgggatcgagggaaggatttcagaa  
ttcgatcctcttctctgttggccaggcggccctcgagccggggagaagccctatgcttgcggaatgtgtaagtcttctc  
tcagagctctcacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatcttttag  
ccagtccagcaacctggtgcgccatcaacgcactcacttggtgagaaagccatacaaatgtccagaatgtggcaagtcttctct  
cggctgacaatctcgtccggcaccacgtactcacaccggggagaagccctatgcttgcggaatgtgtaagtcttctcagcc  
gcagcgataacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatcttttagc  
caggccggccacctggccagccatcaacgcactcacttggtgagaaagccatacaaatgtccagaatgtggcaagtcttctct

cggtctgacaatctcgccggcaccaacgtactcacaccggtaaaaaactagtggccaggccggccagtacccgtacgacgt  
tccggactacgct

Total: 514 bp

Primer F1-f1 of ZFPm2: 2770 bp to 2850 bp

Primer F1-f2 of ZFP m2: 2740 bp to 2790 bp

Primer F2-f of ZFP m2: 2867 bp to 2940 bp

Primer F2-b of ZFPm2: 2824 bp to 2889 bp

Primer F3-b1 ZFPm2: 2916 bp to 2973 bp

Primer F3-b2 ZFPm2: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm2: 3022 bp to 3102 bp

Primer F4-f2 of ZFPm2: 2992 bp to 3042 bp

Primer F5-f of ZFPm2: 3119 bp to 3192 bp

Primer F5-b of ZFPm2: 3076 bp to 3141 bp

Primer F6-b1 of ZFPm2: 3168 bp to 3225 bp

Primer F6-b2 of ZFPm2: 3205 bp to 3273 bp

(15) Partial sequence of pMal-m3 (1-3300 bp) and zinc finger protein ZFPm3

(2719-3270 bp) (SEQ ID NO:16):

ccgacaccatcgaatgggtgcaaaaccttcgcggtatggcatgatagcggccggaagagagtcattcagggtggt  
gaatgtgaaaccagtaacgttatacagatgtcgcagagtatgccggtgtctcttatcagaccgttcccgcgtggtgaaccaggcca  
gccacgtttctgcgaaaacgcgggaaaaagtggaaagcggcgatggcggagctgaattacattccaaccgcgtggcacaaca  
actggcgggcaaacagtcgttgctgattggcgttgccacctccagcttgccctgcacgcgccgtcgaaattgtcgcggcgat  
taaatctcgcgccgatcaactgggtgccagcgtggtggtgctgatggtagaacgaagcggcgtcgaagcctgtaaagcggcg  
gtgcacaatcttctcgcgaacgcgtcagtggtgatcattaactatccgctggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgttcggcggtatttcttgatgtctctgaccagacccatcaacagtatttttctcccatgaagacggtacgcga  
ctgggcgtggagcatctggtcgattgggtcaccagcaaatcgcgctgttagcggggccattaagtctgtctcggcgcgtctgc  
gtctggctggctggcataaatatctcactcgcaatcaaattcagccgatagcggaaacgggaaggcgactggagtgccatgtccg  
gttttaacaaaccatgcaaatgctgaatgaggcgatcgttccactgcgatgctggttgccaacgatcagatggcgtggcg  
aatgcgcgccattaccgagtcggggtgcgcgttggtgcggatatctcggtagtgggatacgacgataccgaagacagctcat  
gttatatcccgccgttaaccacatcaaacaggatttgcctgctggggcaaacagcgtggaccgcttgctgcaactctctcag

ggccaggcgggtgaagggaatcagctgttggccgtctcactggtgaaaagaaaaaccaccctggcgcccaatcgcaaacg  
cctctccccgcgcttggccgattcattaatgcagctggcagcagaggttcccactggaaagcgggagtgagcgcaacgc  
aattaatgtgagtagctcactcattaggcacaattctcatgtttgacagcttatcatcgactgcacgggtgcaccaatgcttctggcgt  
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aaattcgagaaaagataccggaattaaagtcaccgttgagcatccggataaactggaagagaaattccacaggttgcggcaact  
ggcgatggccctgacattatcttctgggcacacgaccgcttgggtggtacgctcaatctggcctgttggtgaaatcaccggg  
acaaagcgttccaggacaagctgtatccgtttacctgggatgccgtacgttacaacggcaagctgattgcttaccgatcgctgtt  
gaagcgttatcgctgatttatacaaaagatctgctgccgaacccgcaaaaacctgggaagagatcccgcgctggataaagaa  
ctgaaagcgaaaggtgaagcgcgctgatgttcaacctgcaagaaccgtacttcacctggccgctgattgctgctgacgggggt  
tatgcttcaagtatgaaaacggcaagtacgacattaaagcgtggcggtggataacgctggcgcgaaagcgggtctgaccttc  
ctggttgacctgattaaaaacaacacatgaatgcagacaccgattactccatcgagaagctgcctttaataaaggcgaaacag  
cgatgacatcaacggcccggtggcatggtccaacatcgacaccagcaaaagtgaattatggtgtaacgggtactgccgacctca  
agggtcaaccatccaacccgttcgttggcgtgctgagcgcaggtattaacgccgccagtccgaacaagagctggcaaaaga  
gttcctcgaaaactatctgctgactgatgaaggtctggaagcgggttaataaagacaaaccgctgggtgccgtagcgctgaagtct  
tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaacgccagaaaggtgaaatcatgccgaacatcc  
cgcatgctccgctttctggtatgccgtgctgactgcggtgatcaacgccgccagcggtcgtcagactgtcgtatgaagccctga  
aagacgcgcagactaattcgagctcgaacaacaacaataacaataacaacacctcgggatcgagggaaggatttcagaa  
ttcgatcctcttctctgtggcccaggcggccctcgagccggggagaagccctatgcttgcggaatgtgtaagtcttca  
gcgatcctggccacctggttcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatcttta  
gcaccagcgggtccctggtgcgccatcaacgcactcactatggcgagaagccatacaaatgtccagaatgtggcaagtcttca  
gccagagctccagcctggtgcgccaccaacgtactcacaccggggagaagccctatgcttgcggaatgtgtaagtccttca  
gccagagcagctccctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatctttt  
agtactgccgcgacctgtctgccatcaacgcactcactatggcgagaagccatacaaatgtccagaatgtggcaagtcttct  
cccaatccagccatctctcggcaccacgtactcacaccggtaaaaaactagtggccaggccggccagtaccggtacgac  
gttcgggactacgct

Total: 514 bp

Primer F1-f1 of ZFPm3: 2770 bp to 2850 bp

Primer F1-f2 of ZFP m3: 2740 bp to 2790 bp

Primer F2-f of ZFP m3: 2867 bp to 2940 bp

Primer F2-b of ZFPm3: 2824 bp to 2889 bp

Primer F3-b1 ZFPm3: 2916 bp to 2973 bp

Primer F3-b2 ZFPm3: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm3: 3022 bp to 3102 bp

Primer F4-f2 of ZFPm3: 2992 bp to 3042 bp

Primer F5-f of ZFPm3: 3119 bp to 3192 bp

Primer F5-b of ZFPm3: 3076 bp to 3141 bp

Primer F6-b1 of ZFPm3: 3168 bp to 3225 bp

Primer F6-b2 of ZFPm3: 3205 bp to 3273 bp

(16) Partial sequence of pMal-m4 (1-3300 bp) and zinc finger protein ZFPm4

(2719-3270 bp) (SEQ ID NO:17):

ccgacaccatcgaatggtgcaaaacctttcgcggtatggcatgatagcgcccgaagagagtcaattcagggtggt  
gaatgtgaaaccagtaacgttatacgaatgctgcagagtagccggtgtctttatcagaccgtttcccgctggtgaaccaggcca  
gccacgtttctgcgaaaacgcgggaaaaagtgaagcggcgatggcggagctgaattacattcccaaccgcgtggcacaaca  
actggcggggcaaacagtcgttgattggcgttgccacctccagctctggccctgcacgcgccgtcgaattgtcggcgcat  
taaatctcgcgcgatcaactgggtgccagcgtggtggtgctgatgtagaacgaagcggcgtcgaagcctgtaaagcggcg  
gtgcacaatcttctcgcgaacgcgtcagtggtgatcattaactatccgctggatgaccaggatgccattgctgtggaagctg  
cctgcactaatgttccggcgttatttcttgatgtctctgaccagacacccatcaacagtattattttctcccatgaagacgggtacgcga  
ctgggcgtggagcatctggtcgcattgggtcaccagcaaatcgcgctgttagcggggccattaagttctgtctcggcgcgtctgc  
gtctggctgggtggcataaatactcactcgaatcaaattcagccgatagcggaaacgggaaggcgactggagtgccatgtccg  
gttttcaaaaaccatgcaaatgctgaatgagggcatcgttccactgcgatgctggttccaacgatcagatggcgtgggcgc  
aatgcgcgccattaccgagtcgggctgcgcgttggtgcggatctcggtagtgggatacgacgataccgaagacagctcat  
gttatatcccgccgttaaccacatcaaacaggatttgcctgctggggcaaacaccagcgtggaccgcttctgcaactctctag  
ggccaggcgggtgaagggaatcagctgttgcctcactggtgaaaagaaaaccaccctggcgcccaatacgaaccg  
cctctccccgcgcttgccgattcattaatgcagctggcagacaggttcccgactggaaagcgggcagtgagcgcaacgc  
aattaatgtgagtagctcactcattaggcacaattctcatgttgacagcttatcatgactgcacggtgcaccaatgcttctggcgt  
caggcagccatcggaaagctgtggtatggctgtgcaggtcgtaaatcactgcataattcgtgtcgctcaaggcgcactcccgttct  
ggataatgtttttgcgccgacatcataacggttctggcaaatattctgaaatgagctgttgacaattaatcatcggtcgtataatgt



gtggaattgtgagcggataacaatttcacacaggaacagccagtcctttaggtgtttcacgagcacttcaccaacaaggacc  
 atagattatgaaaactgaagaaggtaaactggtaatctggattaacggcgataaaggctataacggctcgtgaagtcggtgaag  
 aaattcgagaaagataccggaattaaagtcaccgttgagcatccggataaactggaagagaaattccacaggttgcggcaact  
 ggcgatggccctgacattatcttctgggcacacgaccgcttgggtggtacgctcaatctggcctgttggtgaaatcaccccg  
 acaaagcgttcaggacaagctgtatccgtttacctgggatgccgtacgttacaacggcaagctgattgcttaccgatcgtgtt  
 gaagcgttatcgctgatttataacaaagatctgctgccgaacccgccaaaacctgggaagagatcccggtcgtggataaagaa  
 ctgaaagcgaaaggaagagcgcgctgatgttcaacctgcaagaaccgtacttcacctggccgctgattgctgctgacgggggt  
 tatcggttcaagtatgaaaacggcaagtacgacattaaagacgtgggcgtggataacgctggcgcgaaagcgggtctgacctc  
 ctggttgacctgattaaaaacacacatgaatgcagacaccgattactccatcgagaagctgcctttaataaaggcgaaacag  
 cgatgaccatcaacggcccggtggcatggtccaacatcgacaccagcaaagtgaattatggtgtaacggtactgccgaccttca  
 agggtaaccatccaaaccgttcgttggcgtgctgagcgcaggtattaacgccgccagtcgaacaaagagctggcaaaaaga  
 gttctcgaaaactatctgctgactgatgaaggtctggaagcgggtaataaagacaaccgctgggtgccgtagcgtgaagct  
 tacgaggaagagttggcgaaagatccacgtattgccgccaccatggaaaacgccagaaaggtgaatcatgccgaacatcc  
 cgcatgtccgcttcttggatgccgtgcgtactgcggtgatcaacgccgccagcggctgcagactgtcgtatgaagccctga  
 aagacgcgcagactaattcgagctcgaacaacaacaataacaataacaacacctcgggatcgaggggaaggatttcagaa  
 ttcggatcctcttctctgtggccaggcggccctcgagccggggagaagccctatgcttgcgggaatgtgtaagtccttca  
 gccagagcagctccctgtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatctttt  
 agccagagcagcagcctggtgcgccatcaacgcactcatactggcgagaagccatacaaatgtccagaatgtggcaagtctttc  
 agtgattgtcgtgatcttgcgaggcaccaacgtactcacaccggggagaagccctatgcttgcgggaatgtgtaagtccttctc  
 tcagagctctcacctggtgcgccaccagcgtaccacacgggtgaaaaaccgtataaatgccagagtgcggcaaatcttttag  
 ccgcagcgataacctggtgcgccatcaacgcactcatactggcgagaagccatacaaatgtccagaatgtggcaagtctttctca  
 acttcaggccatttggctccgtcaccacgtactcacaccggtaaaaaactagtggccaggccggccagtaccctacgacgtt  
 ccggactacgt

Total: 514 bp

Primer F1-f1 of ZFPm4: 2770 bp to 2850 bp

Primer F1-f2 of ZFPm4: 2740 bp to 2790 bp

Primer F2-f of ZFPm4: 2867 bp to 2940 bp

Primer F2-b of ZFPm4: 2824 bp to 2889 bp

Primer F3-b1 ZFPm4: 2916 bp to 2973 bp

Primer F3-b2 ZFPm4: 2953 bp to 3021 bp

Primer F4-f1 of ZFPm4: 3022 bp to 3102 bp  
Primer F4-f2 of ZFPm4: 2992 bp to 3042 bp  
Primer F5-f of ZFPm4: 3119 bp to 3192 bp  
Primer F5-b of ZFPm4: 3076 bp to 3141 bp  
Primer F6-b1 of ZFPm4: 3168 bp to 3225 bp  
Primer F6-b2 of ZFPm4: 3205 bp to 3273 bp

(17) Partial sequence of pMal-Ap3 (1-3300 bp) and zinc finger protein ZFPap3

(2719-3270 bp) (SEQ ID NO:18):

ccgacaccatcgaatggtgcaaacctttcgcggtatggcatgatagcgcccgaagagagtcgaattcagggtggt  
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 ctcaactcaggcaacttggctccgtcaccaacgtactcacaccggtaaaaaactagtggccaggccggccagtaccggtacga  
 cgttcggactacgct

Total: 514 bp

Primer F1-f1 of ZFPAp3: 2770 bp to 2850 bp

Primer F1-f2 of ZFPAp3: 2740 bp to 2790 bp

Primer F2-f of ZFPAp3: 2867 bp to 2940 bp

Primer F2-b of ZFPAp3: 2824 bp to 2889 bp

Primer F3-b1 ZFPAp3: 2916 bp to 2973 bp

Primer F3-b2 ZFPAp3: 2953 bp to 3021 bp

Primer F4-f1 of ZFPAp3: 3022 bp to 3102 bp

Primer F4-f2 of ZFPAp3: 2992 bp to 3042 bp

Primer F5-f of ZFPAp3: 3119 bp to 3192 bp

Primer F5-b of ZFPAp3: 3076 bp to 3141 bp

Primer F6-b1 of ZFPAp3: 3168 bp to 3225 bp

Primer F6-b2 of ZFPap3: 3205 bp to 3273 bp

(18) Sequence of oligo m12 (SEQ ID NO:19):

Biotin-GGa gcc tcc ttc ctc ctc tca ctc GGG TTTT CCC gag tga gag gag gaa gga  
ggc tCC

Total: 58 bp

Lower case sequence: ZFPm1 and ZFPm2 binding site m12

(19) Sequence of oligo m34 (SEQ ID NO:20):

Biotin-GGa gcc aac tac tac ggc tcc ctc acc GGG TTTT CCC ggt gag gga gcc gta  
gta gtt ggc tCC

Total: 58 bp

Lower case sequence: ZFPm3 and ZFPm4 binding site m34

(20) Sequence of oligo Ap3 (SEQ ID NO:21):

Biotin-GGt tac ttc ttc aac tcc atc GGG TTTT CCC gat gga gtt gaa gaa gta aCC

Total: 52 bp

Lower case sequence: ZFPap3 binding site

(21) Sequence of oligo NRI-1 (SEQ ID NO:22):

Biotin-GG ttc tac ccc tcc cac cgc GGG TTTT CCC gcg gtg gga ggg gta gaa CC

Total: 51 bp

(22) Sequence of oligo NRI-2 (SEQ ID NO:23):

Biotin-GG tgc ggc gac tgc agc agc GGG TTTT CCC gct gct gca gtc gcc gca CC

Total: 51 bp

(23) Sequence of oligo hHD-I (SEQ ID NO:24):

Biotin-GG ggc ccc gcc tcc gcc ggc GGG TTTT CCC gcc ggc gga ggc ggg gcc  
CC

Total: 51 bp

(24) Sequence of oligo hHD-II (SEQ ID NO:25):

Biotin-GG ggc agc ccc cac ggc gcc GGG TTTT CCC ggc gcc gtg ggg gct gcc CC

Total: 51 bp

(25) Sequence of oligo c5p1-g (SEQ ID NO:26):

Biotin-GG gac acc ccc aac ccc gcc GGG TTTT CCC ggc ggg gtt ggg ggt gtc CC

Total: 51 bp

(26) Sequence of oligo c5p3-g (SEQ ID NO:27):

Biotin-GG ctc tgc tca tcc cac tac GGG TTTT CCC gta gtg gga tga gca gag CC

Total: 51 bp

(27) Sequence of oligo B3c2 (SEQ ID NO:28):

Biotin-GG acc cac cgc gtc ccc tcc GGG TTTT CCC gga ggg gac gcg gtg ggt CC

Total: 51 bp

(28) Sequence of oligo e2c-g (SEQ ID NO:29):

Biotin-GG cac tgc ggc tcc ggc ccc GGG TTTT CCC ggg gcc gga gcc gca gtg CC

Total: 51 bp

(29) Sequence of primer Ap3-F (SEQ ID NO:30):

GGCGAGAGGGAAGATCCAG

Total: 19 bp

(30) Sequence of primer NZlib5' (SEQ ID NO:31):

GGCCCAGGCGGCCCTCGAGC

Total: 20 bp

(31) Sequence of primer Ap3f4-R (SEQ ID NO:32):

CTCCTCTAATACGACTCACTATAGGGACACTCACCTAGCCTCTG

Total: 44 bp

(32) Sequence of primer m4f3-R (SEQ ID NO:33):

CCTCGCAAGATCACGACAATC

Total: 21 bp

(33) Sequence of quantitative PCR probe for AP3 (SEQ ID NO:34):

CCATTTCATCCTCAAGACGACGCAGCT

Total: 27 bp

(34) Sequence of quantitative PCR primer for AP3 (Forward) (SEQ ID NO:35):

TTTGGACGAGCTTGACATTGAC

Total: 22 bp

(35) Sequence of quantitative PCR primer for AP3 (Reverse) (SEQ ID NO:36):

CGCGAACGAGTTTGAAAGTG

Total: 20 bp

(36) Sequence of 2C7-SID (Figure 3) (SEQ ID NO:66):

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